CLAIMS

1. A method of monitoring the wear of a grinding wheel in use, comprising the steps of by measuring the force exerted by a wheelfeed drive which in use urges the wheel into grinding engagement with a workpiece so as to obtain a signal indicative of the force exerted between the wheel and workpiece normal to the grinding face of the wheel at the point of contact between the wheel and workpiece, and generating a warning signal when the value of the signal exceeds a predetermined threshold value.

2. A method as claimed in claim 1 wherein the wheelfeed drive includes an electrically powered motor, the torque developed by which is proportional to the normal force between the wheel and workpiece, and which is in turn proportional to the electrical power drawn by the motor during operation, whereby an indication of the force between wheel and workpiece is obtained by measuring the power demand made by the motor on its power supply.

3. A method as claimed in claim 2 wherein the motor is supplied with electric current from a power supply which maintains a substantially constant EMF, so that the power demand (and therefore the normal force between wheel and workpiece) is proportional to the current drawn by the motor from its power supply.

4. A method as claimed in claim 3 wherein a force proportional signal is obtained by measuring the current flow to the motor during grinding.

5. A method as claimed in any of claims 1 to 4 wherein the value of the force proportional signal obtained during a grinding process on a workpiece is compared with a corresponding value obtained during the

grinding process performed on a preceding similar workpiece, and a warning signal is generated if a current grinding force signal value differs from a preceding grinding force signal value by more than a predetermined amount.

6. A method as claimed in claim 5 wherein a mean value is computed for the force values measured during each of a succession of workpiece grinds on similar components and the value from the grinding of a current workpiece is compared with the mean value computed from a plurality of preceding workpiece grinds on similar components, and the warning signal is generated if the current force value differs from the mean force value by more than a predetermined amount.

7. A method as claimed in any of claims 1 to 5 wherein a timing device is reset at one point during each grinding process, and the force measurement is performed for a period of time determined by the timing device following the reset point, and the values of these force measurement signals (or a mean of these force measurement signal values) is/are compared with force measurement signal values from at least a preceding workpiece grind on a similar component, (or a mean of the force measurement value signals from a plurality of preceding workpiece grinds on similar components).

8. A method as claimed in claim 7 wherein the period of time is selected to correspond to the time during which a part of the grinding wheel which is liable to be subjected to the greatest wear during the grinding, is in grinding engagement with the workpiece.

9. A method as claimed in claim 8 wherein the grinding wheel includes a cylindrical surface and an annular ridge for grinding an undercut in a workpiece, and it is the ridge which is the part of the wheel surface which performs more work than the remainder of the wheel

surface and is therefore liable to the greatest wear during grinding, and the timer is reset at a point during the grinding process, just in advance of when the annular ridge is to come into contact with the workpiece.

10. A method as claimed in any of claims 1 to 5 wherein the force value signals vary in magnitude during grinding, and the peak value of the normal grinding force signal value is measured and compared with a predetermined value, and the warning signal is generated if the measured peak force value signal exceeds a predetermined value.

11. A method as claimed in claim 10 wherein the peak force signal value during the grinding of at least one of a succession of similar components is stored and is employed as a predetermined value with which a subsequent peak force signal value obtained from grinding another of the succession of similar components, is compared.

12. A method as claimed in claim 10 or 11 in which the warning signal is only generated if the peak force signal value for a current grind differs from a stored peak force signal value by more than a predetermined difference.

13. A method as claimed in any of claims 1 to 12 wherein the warning signal is employed to instigate a withdrawal of the wheel from grinding engagement with the workpiece.

14. A method as claimed in any of claims 1 to 13 wherein data logging of force is triggered X seconds after the start of grinding each workpiece, and disabled Y seconds after the start of grinding, where Y is greater than X.

15. A method of monitoring grinding wheel wear, in which the instantaneous power demand of a linear motor drive which advances and

maintains a grinding wheel in grinding contact with a workpiece is monitored during the same part of a grinding process performed on each of a succession of similar workpieces, and a warning signal is generated immediately the power demand exceeds a predetermined value.

16. A method as claimed in any of claims 1 to 15 wherein the warning signal is employed to sound an alarm to alert a machine operator that a wheel change is required, and/or is employed to disengage the wheel from the workpiece to prevent further wear occurring, and/or instigates wheel withdrawal.

17. A method as claimed in any of claims 1 to 15 wherein the warning signal instigates automated wheel replacement in which the wheel is automatically withdrawn from grinding engagement, automatically demounted from its driving spindle and withdrawn from service, and automatically replaced with a fresh wheel ready to take over the grinding from the worn wheel.

18. A method as claimed in any of claims 1 to 17 when used to monitor the wear of Electroplated CBN grinding wheels.

19. A method as claimed in claim 18 wherein the wheels are formed with an annular groove or an annular radial protrusion, the profile of which will grind a complementary profile in the surface of a workpiece.